

Fig. 1

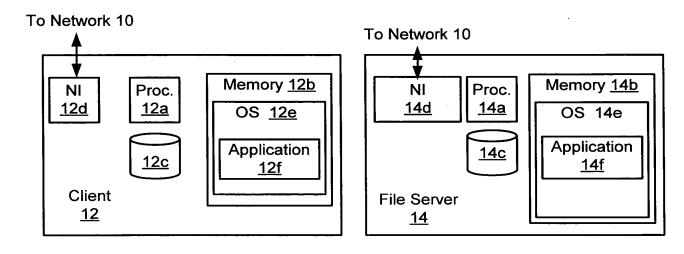


Fig. 2a Fig. 2b

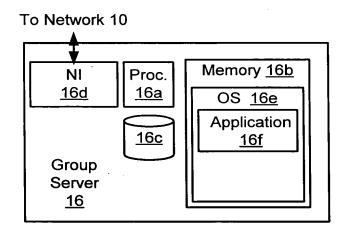


Fig. 2c

| C _a | ^{K} C _a Pub Key |
|----------------|---------------------------------------|
| °а | Carub Key |

Fig. 3a

| C _a | {K} _{Ca} Pub Key |
|----------------|---------------------------------------|
| Сь | ^{K} C _b Pub Key |
| C _c | ^{K} C _c Pub Key |
| C ^d | ^{K} C _d Pub Key |

Fig. 3c

| C_a | ^{K} C _a Pub Key |
|----------------|---------------------------------------|
| С | ^{K} C _b Pub Key |
| C _c | ^{K} C _c Pub Key |

Fig. 3b

| C _a | {K} _{Ca} Pub Key |
|----------------|---------------------------------------|
| С | ^{K} C _b Pub Key |
| Cc | ^{K} C _c Pub Key |
| C ^d | ^{K} C _d Pub Key |
| G ₁ | ^{K} G₁ Pub Key |

Fig. 3d

Fig. 4a
$$C_a\{K\}_{C_a \text{ Pub Key}}\{F\}_{K}$$

$$\textbf{\textit{Fig. 4b}} \quad \text{C_a{\scriptsize K}$}_{C_a \text{ Pub Key}} \quad \text{C_b{\scriptsize K}$}_{C_b \text{ Pub Key}} \quad \text{C_c{\scriptsize K}$}_{C_c \text{ Pub Key}} \quad \text{$\{F\}$}_{K}$$

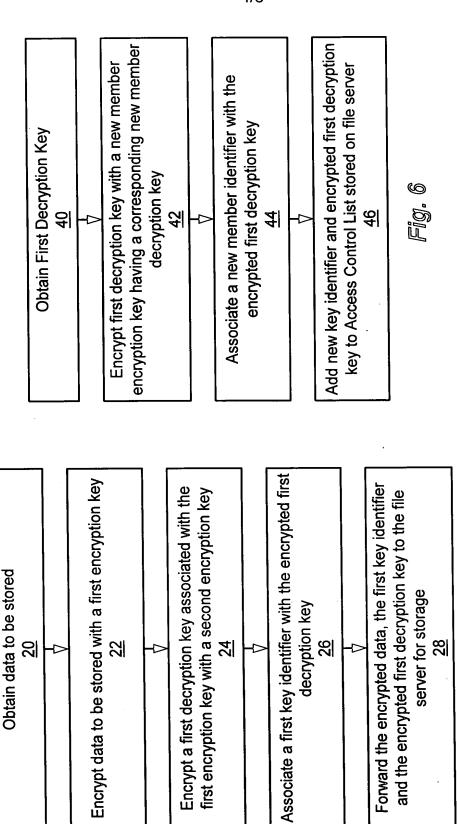


Fig. 5

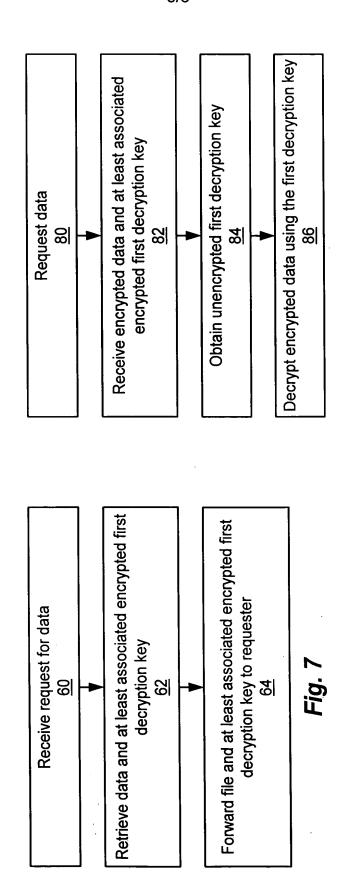


Fig. 8

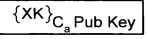


Fig. 9a

| {XK} _{Ca} Pub Key |
|---------------------------------------|
| {XK} _{C_b} Pub Key |
| {XK} _{C_c} Pub Key |
| {XK} _{C_d} Pub Key |

Fig. 9c

| ^{XK} C _a Pub Key |
|--|
| ^{XK} C _b Pub Key |
| ^{XK} C _c Pub Key |

Fig. 9b

| {XK} _{Ca} Pub Key |
|---------------------------------------|
| ${ m \{XK\}}_{ m C_b}$ Pub Key |
| {XK} _{C_c} Pub Key |
| ${ m \{XK\}}_{ m C_d}$ Pub Key |
| ^{XK} G₁ Pub Key |

Fig. 9d

Fig. 10a
$$\{XK\}_{C_a \text{ Pub Key}} \{F\}_{K}$$

$$\textit{Fig. 10b} \quad \{\mathsf{XK}\}_{\mathsf{C_a}\,\mathsf{Pub}\,\mathsf{Key}} \ \{\mathsf{XK}\}_{\mathsf{C_b}\,\mathsf{Pub}\,\mathsf{Key}} \ \{\mathsf{XK}\}_{\mathsf{C_c}\,\mathsf{Pub}\,\mathsf{Key}} \{\mathsf{F}\}_{\mathsf{K}}$$

$$Fig. \ 10c \quad \{ XK \}_{C_a \ Pub \ Key} \ \{ XK \}_{C_b \ Pub \ Key} \ \{ XK \}_{C_c \ Pub \ Key}$$

Fig. 10d
$$\{XK\}_{C_a \text{Pub Key}} \{XK\}_{C_b \text{Pub Key}} \{XK\}_{C_c \text{Pub Key}} \{XK\}_{C_c \text{Pub Key}} \{XK\}_{C_d \text$$